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Transferability of Critical Thinking in Rural Pre-Service Teachers' Classrooms

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This qualitative study explored how pre-service teachers transferred critical thinking skills into practicums and classrooms in rural settings. Additionally, how pre-service teachers fostered critical thinking was examined. Pre-service teachers understood the reasoning behind why it was crucial to enact critical thinking in classrooms with early learners. The nurturing of human skills such as problem-solving and collaborative work was imperative in the younger years. Most participants found that, through observation and learning experiences, they were able to refine their pedagogical strategies. Therefore, the study found four themes that were produced through semi-structured interviews. Finally, how pre-service teachers fostered critical thinking by engaging their young students in active learning was seen. Thus, this study provided insight into how critical thinking is transferred from pre-service teachers to young students, and the means through which this occurs, specifically within rural settings. These findings clarify how pre-service teachers work to foster skills in young students during practicums and student teaching in rural areas.
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Key skills needed for the practice of teaching were acquired during pre-service teaching courses. Such necessary skills encompass those relative to: (a) learning (such as creativity, critical thinking, working together, etc.); (b) literacy; and (c) life (including ownership) (González-Pérez & Ramírez-Montoya, 2022). With an expansive checklist of learning and teaching strategies teachers needed to embed into everyday instructional routines/practices, critical thinking became one of the lowest-ranking priorities (Karlen et al., 2023). Moreover, during pre-service teachers' college courses, less emphasis was placed on critical thinking and/or thinking about thinking (i.e., metacognition) (Dignath & Veenman, 2021). Per Magno (2010), metacognition is spurred by critical thinking, which

occurs when students employ cognitive tools and abilities in pursuit of desirable educational outcomes.

The concept of critical thinking encompassing an educational outcome could be complicated in a rural context, as familiarizing pre-service teachers with teaching in rural areas posed difficulties across a multitude of countries (Mitchell et al., 2019). Rural teaching was also commonly approached from a deficit perspective as opposed to recognizing the assets of rural contexts (Bates, 2018). Further, there was a dearth of research examining how pre-service teachers exposed students to critical thinking in a rural context. Despite this, cultivating critical thinking skills prompted individuals to become competent learners, spurring success in academics and life (Walters, 2022), regardless of one's context. Additionally, possessing critical thinking skills was one of the core competencies needed for career success (Rios et al., 2020). Thus, critical thinking was often conceptualized as the essence of educational endeavors (Magno, 2010; Siegel, 1980). However, urban students were shown to outperform their rural counterparts when it came to critical thinking (Darmaji et al., 2020). This disparity highlighted the need for skilled educators in rural areas, as recognized by Azano and Stewart (2015), who emphasized that highly adept teachers were needed to help students meet standards.

Teachers were the bearers of responsibility when it came to fostering and facilitating critical thinking skills, no matter the age group they taught (Strasser & Bresson, 2017), necessitating a multitude of skills needed to be supplied to pre-service teachers. To facilitate critical thinking in students, pre-service teachers prepared their own critical thinking through college coursework; beyond this, they also built critical thinking through their own self-directed learning (Knowles, 1980). As pre-service teachers completed their final classes, they had the opportunity to practice their recently acquired skills in real-life classrooms in accordance with situated learning theory (Lave & Wenger, 1991; Slade et al., 2019). In this view, knowledge encompassed a contextually embedded, social process. This was echoed by Darling-Hammond (2009), who articulated that teacher preparation often omitted consideration of context, which was core to effective pedagogy. The rural context shaped pre-service teachers' approaches to critical thinking by restricting professional resources; instead, there was a preference for encouraging more personalized, relationship-driven instruction (Tran et al., 2020). This became especially problematic considering that, as pre-service teachers finished their degrees, competence in teaching critical thinking was inhibited by a lack of preparation (Khalid et al., 2021).

Notably, early childhood classrooms needed teachers who were competent and confident in teaching critical thinking (Karlen et al., 2023). Early exposure to critical thinking was essential, placing greater responsibility on teacher preparation programs to prepare future educators with these skills (Williams, 2004). Embedding higher-order thinking, such as critical thinking, into early childhood classrooms is crucial for students' long-term cognitive development (O'Reilly et al., 2022).

Critical Thinking During the Early Years of Life

Brain development starts *in utero* (Van Den Heuvel & Thomason, 2016). Beginning at about age three, a child begins using reasoning and problem-solving skills (O'Reilly et al., 2022). To help the brain develop, facilitating higher-order thinking needs to be implanted and taught consistently throughout one's life (Immordino-Yang et al., 2019). According to the U.S. Census Bureau's (2023) data, 75.2 million children aged three years and up were enrolled in school at the end of the 2022 school year. For the year 2019, there were 9.8 million *rural* students in public elementary and secondary schools, which amounted to nearly 20% of the total student body within public schools (National Center for Education Statistics, 2023). This meant there were millions of rural children who needed to be supplied with critical thinking skills.

The more exposure to critical thinking environments, the greater the magnitude of higher-order thinking occurs (Swartz, 2004). Swartz (2004) espouses that the benefit of critical thinking skills for younger learners is the capacity in which those learners could build off prior knowledge. The earlier an individual is exposed to reasoning and problem-solving, the better, as executive functioning is core to brain development (Doebel, 2020). The role of executive function in higher-order thinking includes the ability to self-regulate, which prepares the brain to be open to more complex thinking (Li et al., 2021).

Critical Thinking in Early Childhood and Adolescence

In the classroom context, an individual's environment is one of the most crucial factors for brain development (Miguel et al., 2019). Per Suryanti and Nurhuda (2021), enhancing students' critical thinking encompasses an indispensable goal for higher education. However, Tapper (2004) found that critical thinking was directly taught to students only in the initial year of higher education. Notably, Celuch and Slama (2000) found that a class format designed around critical thinking was preferred by students over a lecture-based approach. A preference for how critical thinking was taught could be affected by past exposure to critical thinking, including during adolescence.

Adolescence encompasses a notably rich time period to spur critical thinking, especially if students can devise how to develop their higher-order thinking skills (Conklin, 2018). Mislia et al. (2019) indicated that an individual, whether considered intelligent or not, should possess critical thinking skills. However, adolescents experienced issues in weighing and assigning credibility to evidence, namely in deciding whether it was high quality (Ku et al., 2019). Assessing credibility remained core as "[c]ritical thinking in the post-truth era demands that news users develop and maintain a skeptical way of knowing, and cultivate the ability to discern evidence-based and unbiased information to make sound judgments" (Ku et al., 2019, p. 1).

To help facilitate critical thinking in students, teachers of adolescent students must acknowledge the difference among higher and lower order thinking (Mislia et al., 2019). To achieve higher order thinking an individual needs to take prior knowledge and then relate or reposition said information in pursuit of addressing a problem (Lewis & Smith, 1993). Problem-based learning through questioning comprises a technique for teachers to use to focus on critical thinking skills through real-world problems for adolescent students (Dalim et al., 2022). Though critical thinking is believed to encompass an important aspect of learning, critical thinking often is not utilized to its full capacity in classrooms (Karlen et al., 2023). Further, Butcher et al. (2023) found that teachers need to know when and how to allow students to productively struggle, which is an important component of critical thinking in adolescence. In a similar vein, Yang et al. (2022) remarked that pre-service teachers are typically taught how to teach content and less of how to engage students in inquiry.

Pre-Service Teacher Perceptions of Critical Thinking in Their Classrooms

Pre-service teachers know the importance of teaching and facilitating critical thinking in the classroom, but often feel burdened by it (Dalim et al., 2022). Often, the overwhelming feeling of planning for critical thinking establishes negative pre-service attitudes toward teaching it (Janssen et al., 2019). Additionally, pre-service teachers struggle to think beyond what is taught as teacher-directed practices (Slade et al., 2019).

Du Plessis (2020) indicates that even though pre-service teachers understand the importance of critical thinking, many constraints hinder their abilities to implement it; these constraints include overcrowded classrooms, issues with students' behavior, and a lack of time. Issues for students are further complicated in rural areas, which can hold limited economic opportunities for graduates (Biddle & Azano, 2016). Adding to this, teachers' perceptions of innovative learning techniques and critical thinking determine if and how they use critical thinking strategies in classrooms (Munawaroh et al., 2018). Thus, critical thinking needs to be embedded and stressed within teacher preparation programs, including during practica.

A pre-service teacher must supplement coursework with a practicum or student teaching to be able to teach in areas such as early childhood education (Kim, 2020). In a practicum, pre-service teachers practice the knowledge and skills they attained during their teacher preparation programs. Importantly, pre-service teachers often lack teaching preparation in rural settings during practicum, despite this preparation being a potential necessity to be an effective rural teacher (Versland et al., 2020). This gap in rural-specific preparation underscores a broader concern, as Moffa and McHenry-Sorber (2018) recommend that pre-service teachers need a nuanced understanding of rurality to be prepared to teach. Accordingly, Azano and Stewart (2015) espoused: "Efforts to recruit teachers to work in rural schools are futile if those teachers are not adequately prepared to provide instruction that meets the needs of the students" (p. 1). When able to practice

in a rural classroom, pre-service teachers in rural areas feel more prepared in teaching human skills and content (Jordon, 2019). They could then design assessments, such as rubrics, to test for the acquisition of critical thinking skills.

Critical Thinking in Rubrics and Assignments

Critical thinking could be spurred through feedback. Crichton and Valdera Gil (2015) state that pre-service teachers recognize that three types of feedback give depth to their reflective practices. The three types of feedback include: (a) pre-service teachers' mentors; (b) pre-service teachers' peers; and (c) the students in the classroom where student teaching was conducted (Crichton & Valdera Gil, 2015). Further, feedback for pre-service teachers could be rubric-driven.

Rubrics are intentional tools to link outcomes with assignments regarding content and desired skills (Braun et al., 2020). Rubrics and assignments provide a guide for teachers, but, more importantly, a rubric allows for measurement of skills, such as critical thinking (Braun et al., 2020). Rubrics could also be written to allow for authentic assessment, which more closely reflects the real-world context where school-based learning could be applied (Jonsson & Svingby, 2007).

Real-World Application in Pre-Service Teacher Assignments

Pre-service teachers need reflection to spark higher-order thinking, which then allows coursework to transfer into real-world applications (Saeed & Ahmed, 2021). Specifically, "reflective practice [facilitated] the development of new knowledge, skills, and dispositions in the teacher candidates by fostering critical contemplation of actions in a real-world environment" (Slade et al., 2019, p. 2). Pre-service teachers who link fieldwork back to content are able to form deeper connections with what is being taught (Slade et al., 2019). Although teacher-directed instruction could be helpful in initial knowledge building, critical thinking relies on a student leading their own learning (Dewi & Primayana, 2019).

Willingham (2008) stated that teaching critical thinking relies upon enabling the necessary thinking at the appropriate time. Thereby, recruiting ambitious pre-service teachers who want to attain and transfer the critical thinking skills is imperative (Oyen & Schweinle, 2021), which proves challenging in a rural context. This challenge is further compounded by the issue that, in the rural U.S., teaching turnover is a struggle in schools (Nguyen, 2020).

Teaching in the Rural U.S.

Oyen and Schweinle (2021) point out that teaching in rural areas is less desirable to pre-service teachers as salaries are much lower than for their urban counterparts. Furthermore, geographical amenities such as housing and shopping are insufficient and less desirable for the new teacher workforce (Oyen & Schweinle, 2021). However,

although some challenges are present in rural schools for the workforce, learning to adapt a multiple-grade curriculum, not uncommon in a rural setting, is beneficial for all teachers (Jenkins & Cornish, 2015). Additionally, according to Tran et al. (2020), some benefits of rural schools include smaller classroom sizes, a family-like environment, and support from leadership/administration.

Given that a positive outlook towards content enhances teaching (Janssen et al., 2019), a positive work culture afforded by a rural environment could lead to a more open atmosphere to incorporate critical thinking in classrooms. Furthermore, pre-service teachers with a rural high school background are more likely to feel comfortable teaching critical thinking skills as they themselves have developed these skills (Oyen & Schweinle, 2021). Notably, embedding critical thinking into the classroom is the responsibility of the pre-service teacher, which constitutes the goal-driven component of self-directed learning (Karlen et al., 2023).

While many researchers emphasize the lack of preparation for rural teaching (Azano & Stewart, 2015; Versland et al., 2020), others highlight the unique benefits of rural environments, such as stronger community ties, smaller class sizes, and flexible, educational approaches (Tran et al., 2020; Jenkins & Cornish, 2015). This contrast suggests that rurality is not a deficit, but rather a complex setting where certain aspects of critical thinking might be enhanced (e.g., through mentorship), even as others are constrained (e.g., limited professional development). These opposing views highlight the importance of viewing rural settings not as static, but as situated learning environments, requiring a nuanced understanding of rurality, in accordance with situated learning theory, to understand how self-directed learning developed in rural pre-service teachers.

Theoretical Framework

Self-Directed Learning Theory and Situated Learning Theory

In self-directed learning, agency in the learning process occurs alongside reflection (Karlen et al., 2023). Here, an adult learner takes control over their learning and is inquisitive about the knowledge they want to learn (Knowles, 1980). Specifically, Knowles (1975) defined the concept of self-directed learning as a process in which individuals take initiative over their learning by: (a) setting learning needs; (b) arriving at learning aims; (c) recognizing resources to further learning; (d) implementing sound learning strategies; and (e) evaluating one's learning progress. In the workplace, such as a school, an employee with the characteristics of a self-directed learner, who is curious and able to solve problems, is an asset (Rios et al., 2020), which is particularly relevant to pre-service teachers, who must actively connect theoretical coursework with practical classroom teaching. Thus, self-directed learning offers a meaningful framework for examining how pre-service teachers navigate critical thinking practices before they transition into their own classroom teaching experiences, such as in rural contexts.

The level of self-directed learning depends on factors such as personal characteristics (e.g., maturity) along with sociodemographic factors (Loeng, 2020). According to Aşkın Tekkol and Demirel (2022), teacher candidates who encapsulate lifelong learning are apt to learn when they see a benefit to their development. Thus, agency over one's learning could help prompt the development of an effective teacher.

Self-directed learning is essential to pedagogy when engaging with younger minds (Evin Gencel & Saracaloğlu, 2018). If adult teachers have self-directed skills, they could be mentors to the children they teach, helping guide those students into becoming self-directed students (Nasri, 2019). Furthermore, the more ready a student is for self-directed learning, the more prepared they are for critical thinking (Turan & Koç, 2018). Additionally, self-directed learning relies on students connecting new and prior knowledge to eventually arrive at new ideas (Oyibe et al., 2015), which aligns with Magno's (2010) conception of critical thinking. However, while self-directed learning theory focuses on taking initiative over one's own learning that nurtures critical thinking, situated learning theory (Lave & Wenger, 1991) provides a complementary perspective by highlighting the contextual (e.g., rural) and social nature of learning. For pre-service teachers, especially in rural environments, learning is embedded within relationships and routines of their school community (Mazzuki, 2025). By integrating situational learning theory, this study recognized that critical thinking is nurtured by agency and developed through engagement with others in meaningful contexts.

In the present study, the perceived ability that rural pre-service teachers had in transferring critical thinking was studied along with how it was fostered in their students. Specifically, this study sought to understand pre-service teachers' perceived abilities to transfer critical thinking skills, and the means with which this was done, to the student teaching or practicum context. Given the emphasis on perception, data collection relied upon qualitative methods.

Methods

This study employed a basic qualitative research approach aimed at understanding how participants conceptualized, built, and made sense of meaning (Merriam & Tisdell, 2015). Unlike grounded theory, which seeks to build theory or case studies that focus on bounded systems, basic qualitative studies aim to understand meaning-making around a central phenomenon. This approach allowed a depth of understanding with respect to rural pre-service teachers' experiences. Specifically, rural pre-service teachers were asked about critical thinking skill transfer to their K–12 students. Namely, this study was interested in how pre-service teachers transferred critical thinking from their coursework to their student teaching/practica as well as what fostering critical thinking within their students encompassed.

This study involved interviews of pre-service teachers. A semi-structured interview approach allowed participants to describe their perceptions while permitting flexibility in

question order, allowing for probing (Merriam & Tisdell, 2015). Further, rubrics were collected from teachers to ascertain if/how critical thinking was embedded into assignments to ascertain the extent to which critical thinking was embedded within materials taught by pre-service teachers. As such, multiple data collection techniques were present in this study to help permit a more holistic view of the phenomenon undergoing examination (Merriam & Tisdell, 2015).

Sampling Criteria and Participant Selection

Students in elementary education programs at rural institutions were eligible to participate. Specifically, as the focus was on pre-service teachers' teaching experiences, participants needed to be eligible for field experiences, also known as the practicum/student teaching. In detail, field experiences were in the latter portion of teaching programs, requiring participants near the end of completing their programs. Student teaching, thus, was open to students who met degree requirements prior to junior year status. Pre-service teachers in the last two years in their courses applied learned teaching strategies in a real context, such as lesson planning and student teaching. A total of five participants were included in this study, allowing for rich, detailed descriptions of participants' experiences and perspectives, consistent with the goals of basic qualitative research (Merriam & Tisdell, 2015). Rather than aiming for broader transferability, the study prioritized a rich, detailed understanding of the process of critical thinking transfer. As Tight (2024) noted, the potential for variation in responses, even with the addition of a single participant, could vary. All participants herein attended institutions in rural portions of the Midwest.

Data Collection and Analysis

Prior to interviews, participants were asked to provide a rubric created to be used in the K–12 classroom setting. Two participants supplied their rubrics herein, limiting said analysis. Interviews then permitted the points of view of participants to be examined and understood by researchers (Patton, 2015). To help ensure participants' comfort, they were permitted to choose the locations of interviews on their side as they were conducted virtually via Zoom. Zoom was also the medium used to transcribe interviews. Upon completion of post-member checking, recordings were destroyed with pseudonyms being applied.

Data was analyzed through an inductive approach. Given this, participants' words and stories guided the eventual creation of themes (Patton, 1990). Once the data were collected, it was analyzed following thematic analysis. Specifically, Braun and Clarke's (2006) six steps of thematic analysis were followed. Familiarization with the data (step one) occurred through reading and re-reading with memoing to ensure a reflexive approach to analysis. Initial codes made by labeling phrases (step two) were then created before the search for themes, or where labels started to converge into larger patterns,

encompassed step three, which then moved to theme review (step four). Prior to arriving at themes (step five), they were also reviewed in a reflexive manner. Finally, a write-up of the findings was produced (step six), telling a larger story with the data. Beyond this, trustworthiness was embedded into the design of this study.

Trustworthiness

When considering trustworthiness, credibility, transferability, dependability, and conformability needed to be addressed (Lincoln & Guba, 1985). The data collected herein was made trustworthy using the aforementioned techniques. This process encompassed looking at the data reflexively to help ensure participants' voices were represented throughout, which was supported through credibility.

Credibility

Member checking was conducted with participants to aid in facilitating an accurate interpretation of participants' words. Lincoln and Guba (1985) remarked that member checking was "the most crucial technique for establishing credibility" (p. 314). Additionally, triangulation assists a qualitative study's credibility (Lincoln & Guba, 1986). In this study, data sources included both semi-structured interviews and rubrics, where quotes were richly incorporated.

Transferability

Geertz (1973) specified thick descriptions as a means of arriving at transferability. Thus, the data in this study provided contextual information and quotes from participants while respecting anonymity. The quotes herein allow the reader to assess additional context from participants' words, allowing further insight as to whether the researchers' findings would be applicable to a reader's context.

Dependability

Shenton (2004) remarked that dependability involved detailed reporting to help ensure that another researcher would arrive at similar results. Accordingly, an audit trail was kept throughout the research process (Lincoln & Guba, 1986). Within this audit trail, there were comments on the rationale underlying coding decisions. With memoing, reflexivity allowed for reflection on biases to help maintain a division of the researchers' and participants' voices.

Confirmability

Lincoln and Guba (1985) contend that confirmability is achieved when credibility, transferability, and dependability are embedded and realized within a line of qualitative inquiry. Collectively, this study employed layered member checks, triangulation, thick

description, an audit trail, and reflexivity. These techniques helped ensure the confirmability and the overall rigor of this study's results.

Findings

The qualitative research herein sought to understand how pre-service teachers from a rural context envisioned embedding critical thinking in their practica or student teaching. Collectively, through inductive coding, four themes were constructed. These themes encompassed: (a) modeling critical thinking; (b) active learning engagement; (c) real-world content application; and (d) cultivating human skills. The results begin with a discussion of how pre-service teachers employed critical thinking elicitation techniques that were modeled by other educators.

Modeling Critical Thinking

How pre-service teachers taught critical thinking to their students in practica was often modeled by other teachers and instructors. Morgan pointed out how modeling could occur across contexts, "I definitely have used some of the things that I have learned in my courses, in my, in my internships in the classroom now as a para [*sic*]." Notably, a few pre-service teachers provided specific examples of how they modeled their pedagogies and techniques. Here, Sam succinctly said, "I think some of the biggest ways that we've learned, and just personally, I've kind of collected observing other educators." Sam went on to give an example from an English professor, exhibiting situational learning theory:

> My English professors, they aren't really instructing how to teach at all, but because I know that's the avenue that I'm going down, I try to really take what they're doing, and say, "Okay, how could I apply this or try to observe it that way?" A big thing I've learned with those professors is that it really makes all the difference if you're excited about the material.

The emphasis on material excitement aligned with the core of self-directed learning.

Sidney had a similar example to Sam's in English, where an instructional strategy was modeled: "In our English class.... That we're in, we talk a lot about giving the students chances to think about it individually, think about it with a partner, and then actually talk... I personally use a lot of think-pair-share." A mentor teacher also shaped Jordan's teaching perspective and how that then changed the approach to critical thinking: "One of my mentor teachers...really put it in perspective for me. She helps those who help themselves first...make them think for themselves."

The effect that modeling could have on pre-service teachers was essentially captured by Sam, who articulated:

> Really good little phrases and concepts that I've held onto a lot, and I know I will use in the future from the professors. Depending on what area of the country you teach in, even the size of a town, all really impacts and contributes to the way students see the world.

In the rural context, this was especially evident because smaller schools promoted closer relationships between pre-service teachers and mentor educators, allowing for more consistent and individualized modeling of critical thinking strategies. Overall, the impact that other educators had on pre-service teachers came through in how they modeled their instruction, which Sam highlighted was especially key for rural educators to help ensure K–12 students become well-rounded. Similarly, Strasser and Bresson (2017) noted that teacher skill level affected critical thinking, facilitating skills across all age spans, particularly in the younger years. They further noted how these techniques could help students build their critical thinking and learn new perspectives. Pre-service teachers went beyond modeling to actively promote learning within their own students in the practicum.

Active Learning Engagement

Participants relayed that they employed multiple techniques to actively engage students in the learning process. Namely, pre-service teachers aimed to be student-centered, which then spurred critical thinking. In student-centered learning, students could perform individually; the teacher was more of a facilitator of the learning by coaching and consulting during the learning process (Dada et al., 2023). Sam made a point of this learning approach, “Recognizing the difference between just teaching or just instructing and then facilitating, trying to be more student-centered is really the bottom line.”

Morgan described how critical thinking was spurred in students by various interactive teaching techniques:

> I do a lot of open-ended and play-based stuff. That way they have the ability to learn more than just what I have set forth for them to learn. I ask a lot of unscripted questions when we’re doing the activities or the lessons to kind of generate some more critical thinking aspects to it.

Robin also adopted questioning techniques to facilitate deeper learning, detailing, “They have to find evidence from our examples from the book and justify their thinking why those examples fit that theme.” This was supported by Robin’s rubric, but not in a sense of deepening learning. The rubric was for a reading lesson where the maximum score of five points was awarded when students could accurately detail themes and then support that with evidence from the book being read. However, there was no deeper questioning to support the demonstration of factual evidence. This contrast between spoken intention and assessment practice suggested a gap between theoretical understanding and implementation. Dalim et al. (2022) stated that using questioning as a technique could foster critical thinking skills in learners. However, this would need to extend beyond recall, which was primarily what was occurring in Robin’s rubric. This misalignment pointed to a broader challenge among pre-service teachers: aligning instructional philosophy with practical tools like rubrics.

Additionally, Robin spoke abundantly of the need for “productive struggles” in a critical thinking environment. Robin further stressed that students needed to be provided with challenges to think and grow: “They learn more through when they find the answer themselves... If you’re just telling them...They’re not going to remember it as long as if they actually had to work it out for themselves.” Thus, it appeared that follow-up questioning took place beyond what was solely captured in the rubric. Similarly, Jordan expressed that students needed to experience frustration to learn, “It’s challenging the students to think for themselves.”

In-depth questioning could help create self-directed learners. Similarly, Dalim et al. (2022) pointed out that one of the most important aspects of critical thinking for adolescents was problem-solving, which was alluded to by Sam. Sam commented on the importance of building students’ comfort in becoming self-directed learners:

> ...[T]o me is student autonomy and student advocacy. On my side of things, trying to support them and give them a space where they can feel comfortable growing in all those ways, that takes a lot of hard work on their end. The end goal is for those students to be able to have agency over themselves and have the motivation and the good relationships with their own education and, with whatever their goals are, so that they can meet those goals.

Importantly, autonomy in learners was valued across all pre-service teachers, which aligned with self-directed learning. Independence in learning was promoted by adopting an active approach to engage students in the learning process. Thus, allowing students agency was seen as a means of building self-directed learners who would then be comfortable and confident to oversee their own learning. Ultimately, this was achieved through a student-centered approach to learning. Active learning could further be spurred by real-world content application to develop students’ critical thinking skills.

Real-World Content Application

Slade et al. (2019) articulated the importance of pre-service teachers’ real-world applications alongside their abilities to be reflective practitioners. Both rubric content and interview reflection emphasized how pre-service teachers were innovative in applying learned content to the real-world context. Jordan detailed how critical thinking was used to apply psychology coursework in teaching:

> As a para [*sic*] before I transferred to this college, psychology classes that I had to take really helped with some of my kiddos [*sic*]. I had one student that is schizophrenic, so the way that he sees the world is much different than you and I. Just the things that he would see, the hallucinations, and the voices... Really making sure and having how to guide him through the day as a third-grade boy that’s seeing and hearing stuff that’s not there, I took the strategies that I learned from my psychology class and tried it. And it worked. It was actually put in place with his [individualized education program (IEP)] teacher.

Jordan's ability to apply critical thinking centered on understanding the third-grader's unique needs, where there was a recognition of how previous content could guide an IEP. This supported how Jordan engaged in situated learning theory as similarly experienced by Sam.

Along with the classroom, Sam spoke how outside experiences helped shape her educational perspectives:

> I think I've had good professors that have taught me quite a few things, and then I think a lot of it has been, I've been very fortunate to have a lot of experience outside of my classes... The first year I was a general counselor and dropped into a whole new world I had never been in and did really well."

Sam went on to add how her perspective on educating evolved throughout experiences, "The second summer I came back as more of an administrative role where I was a program director, so I created a lot of the content and programming that we had for all of the kids...Okay, I can be a little bit more courageous, if you will, and I think it allows me to open up my view of how educating works."

Morgan detailed how coursework drove changes to how a student was completing an assignment, "In my internships, in the classroom, now as a para [*sic*]... [Who] I am working with has not tried a certain particular method." Morgan went on to detail a story to illustrate this scenario:

> I'm like, "Hey, let's give this a try, because I learned about it in school." Let's see if this is more helpful...We have a student that functions at a preschool level but is 14...We are working on letter identification with this student, and the teacher wanted to have him match the upper- and lower-case letters, but she used these [puzzle pieces]...I noticed he's not matching the letters at all...He just sees that this fits into this, and that's what makes them a match. So, I talk to my teacher about that we need to go back even earlier than this skill level, because he's not understanding that this is an upper case, this is a lower case...I was like, "We need to go back further, and there's more issues..." The teacher that I am referring to, she was going off what the teacher prior to her had first goals.

Just as pre-service teachers strived to build self-directed learners, they were able to display the same skills in their own application of content knowledge and across a myriad of situations. As Willingham (2008) remarked, timing was a key consideration for critical thinking. For pre-service teachers, whether it was knowing the right strategy to guide a student's learning or creating content, these pre-service teachers demonstrated how their own critical thinking drove their students to think critically. Thus, they were able to apply their learning to the real world. However, real-world thinking, though important, needed a complementary feature: human skills.

Cultivating Human Skills

Pre-service teachers were passionate about their craft. Jordan conveyed a joy for teaching, “I provide them opportunities to become better people. That’s like the whole reason why I wanted to teach.” These opportunities were often provided in the form of human skill development. Sam expressed how this was key throughout lesson design, “I think it’s really important to have that infused in every lesson and activity just because those more human skills are how students become better learners.” Thus, the cultivation of human skills could translate into a stronger ability to think critically. Jordan further commented on this notion:

> I hope that all the students have the ability to be kind to one another...Critical thinking is way high up there. I would maybe say that critical thinking maybe comes first, because if you or use critical thinking skills and social scenarios, it’s needed also...Social cues, body language.

Morgan expressed that while critical thinking was important, balancing this with social-emotional skills was crucial for success:

> Some major skills at that age are social emotional skills. Number one, in my opinion. Because you can be academically, the brightest person on the planet, but if you can’t get along with anyone else, that makes for a very difficult and challenging for you and everyone around you.

Sidney stressed how communication was a critical skill to develop in students, “I want them to have people skills, in general, be able to have a conversation with almost anybody. That’s something very important in life.” Nonetheless, Sidney also stressed critical thinking, “It’s definitely essential for them to become critical thinkers, cause [*sic*] it helps you later in life...Think about how you’re going to pay this next month’s bill. Paying a bill would rely on critical thinking and, potentially, communication skills.” In a similar vein, Robin saw value in problem solving, “To keep working through and persevering with problem-solving skills...Is something I would want to stress in the future.”

As a collective, though pre-service teachers valued critical thinking, they also wanted students to have human skills. Communication and interpersonal skills were needed to work well with other human beings. As Morgan noted, even the most intelligent individual would need to be able to get along with others to be successful in life. Thus, pre-service teachers majoring in working with younger students valued them becoming well-rounded adults.

Discussion

In a rural context, while relationships may be rich, other lacking resources could inhibit pre-service teachers’ development of instructional skills like critical thinking. Despite critical thinking often being a low instructional priority for teaching (Karlen et al., 2023), pre-service teachers studied actively engaged in incorporating critical thinking for their students during practicums within the rural setting, which aligned with situated

learning theory (Lave & Wenger, 1991). For example, after observing mentor teachers who modeled pedagogy that incorporated critical thinking, pre-service teachers become more intentional about engaging students in active learning. In rural classrooms, smaller class sizes further supported this approach by enabling more one-on-one questioning, which may enhance critical thinking. This further helped provide a well-rounded perspective for rural K–12 students. Given that pre-service teachers with increased confidence in teaching critical thinking skills are more apt to teach in rural areas (Oyen & Schweinle, 2021), this could support the transfer of critical thinking skills to rural students. These findings extend self-directed learning (Knowles, 1980) by illustrating how pre-service teachers, when placed in rural contexts, actively adapt and apply learned strategies through autonomy and reflection. The pre-service teachers further fostered this in their own students by encouraging struggling or autonomy.

Further, while Slade et al. (2019) noticed that pre-service teachers struggled to think beyond pedagogy, creative content application demonstrated that pre-service teachers were able to think of skillful and student-centered ways to spark critical thinking in K–12 classrooms. In this sense, they demonstrated both critical thinking and self-directed learning, taking ownership of their learning. Thus, as opposed to feeling burdened by critical thinking as was found in (Dalim et al., 2022), pre-service teachers actively promoted critical thinking for their students. Even though a rubric could be limited to recall, follow-up questions allowed K–12 students to gain critical thinking skills. Accordingly, it is important to note that rubrics might need to be enhanced to ensure assessment of mastery over critical thinking skills. Applying Jonsson and Svingby's (2007) findings on how authentic assessment could make real-world connections, this approach could be used to help guide rubric development for teacher candidates, especially those interested in the rural context.

Additionally, pre-service teachers were intentional about viewing their students as human beings, not just academic learners. As a result, they consciously designed lessons and activities that promoted the development of human skills. In rural, tight-knit communities where relationships are central, these human skills—such as communication and collaboration—are foundational to critical thinking, which supports Strasser and Bresson's (2017) findings on emotional learning and further aligns with the social participation emphasized in situated learning theory (Lave & Wenger, 1991). Pre-service teachers valued critical thinking and understood that critical thinking did not exist in isolation but was deeply connected to other skills needed to thrive as adults. Development of such personal characteristics, which mirrored Knowles' (1980) self-directed learning framework, could help drive the development of self-regulated learners (Loeng, 2020) within rural settings. Collectively, pre-service teachers spurred critical thinking in their rural students through their own self-directed learning.

Recommendations for Practice

Moffa and McHenry-Sorber (2018) stressed the need to recognize how rurality was not a singular, uniform concept. For pre-service teachers to be prepared to foster critical thinking in rural students, especially with features such as a lack of professional development (Tran et al., 2020), several considerations need to be made:

1. "Grow Your Own" programs should be conceptualized in a way that aligns with situated learning theory. In this sense, a specific rural context should be uniquely considered to foster pedagogy that aligns with students' contextual understanding and experiences. This could be supported by having students immersed in sustained practicum placements of a variety of rural settings to understand that *rural* is a rich construct.
2. Digital technologies can permit a rich variety of teaching experiences in practicums. For example, video conferencing can be used to see what rural teaching looks like in one subject in the Midwestern U.S. Then the Southern U.S., allowing more opportunities to see how educators promote critical thinking and self-directed learning in their students. This will allow further pre-service teachers to observe and engage in reflective dialogue with educators in different rural regions.
3. Recognize the importance of relationships for the rural context and integrate this skill development into teacher preparation coursework. This recognition can help move away from deficit thinking and allow pre-service teachers to cultivate communication and human skills alongside content pedagogy. This integration can further allow for a larger mindset of collaboration to allow resource leveraging across a rural community.

Limitations and Future Research

This study sought to understand the experiences of rural pre-service teachers. As such, other contexts and institutions might have different experiences with students. Further, only two of the participants provided rubrics for analysis. Future researchers could interview and examine the rubrics of students in other contexts to see what fostering and transferring critical thinking entails. Additionally, this research focused on those who were still pre-service teachers. Future researchers could longitudinally examine what critical thinking looks like throughout time as teachers progress from their practicum experiences throughout their teaching careers. Finally, in terms of adapting materials, future researchers could examine how artificial intelligence may affect student engagement when used by pre-service teachers, as well as the resulting effect on the ability to be a self-directed learner. Collectively, this would help guide how to foster critical thinking practices to ensure the successful transfer of these skills to K–12 students.

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